Chapter 2

Site Selection and Identification

- Introduction to Volunteer Water Quality Monitoring Training Notebook -

When you begin monitoring, the first thing you will need to do is select a site. As defined for our purposes, a "site" is a 300-foot-long segment of stream. Ideally, a site includes at least one riffle (when monitoring an Ozark stream), or a variety of habitats such as root mat, snags, and non-flow habitat in prairie or lowland streams. **Volunteers may choose to monitor any stream in which they have an interest.** An important factor in selecting a site is to choose a stream that is close to where you live so that monitoring is convenient for you.

In order to receive your biological monitoring equipment, it will be necessary for you to choose a site, perform an initial survey of the site using the special Site Selection Data Sheet provided to you at your Introductory Workshop, calculate the stream discharge within your site using the Stream Discharge Data Sheet, and submit the data sheets to program staff. Once you have completed these steps, you will be mailed a set of biological monitoring equipment which will be on loan to you for as long as you are participating in the program. This equipment will include 3x3 foot net, hand magnifiers, forceps, and sample vials. If you choose to leave the program, we ask that you return your equipment to us so that it can be issued to another volunteer.

Reasons for choosing a particular monitoring site vary widely. Past and present volunteers have chosen sites for the following reasons:

1.) Interest in a stream on their property, in their neighborhood, community, or on school property.
2.) A desire to protect a favorite fishing or float stream. Healthy streams are often not monitored regularly by state agencies. Limited numbers of staff must prioritize their efforts, often focusing on the worst situations first. Having volunteer data available from these streams can be very helpful when questions arise about their historical condition. This baseline data is invaluable to agencies when disasters occur, such as a hazardous material spill, pipeline break, etc.

3.) Concern about impacts on water quality in their adopted streams from point source or nonpoint source pollution discharges.

4.) The site is of concern to state agencies. Personnel working on water-related issues in the regional offices of the Departments of Natural Resources and Conservation may have specific concerns about particular local streams. Volunteers have contacted them for any suggestions they might have regarding streams of concern or possible sampling sites.

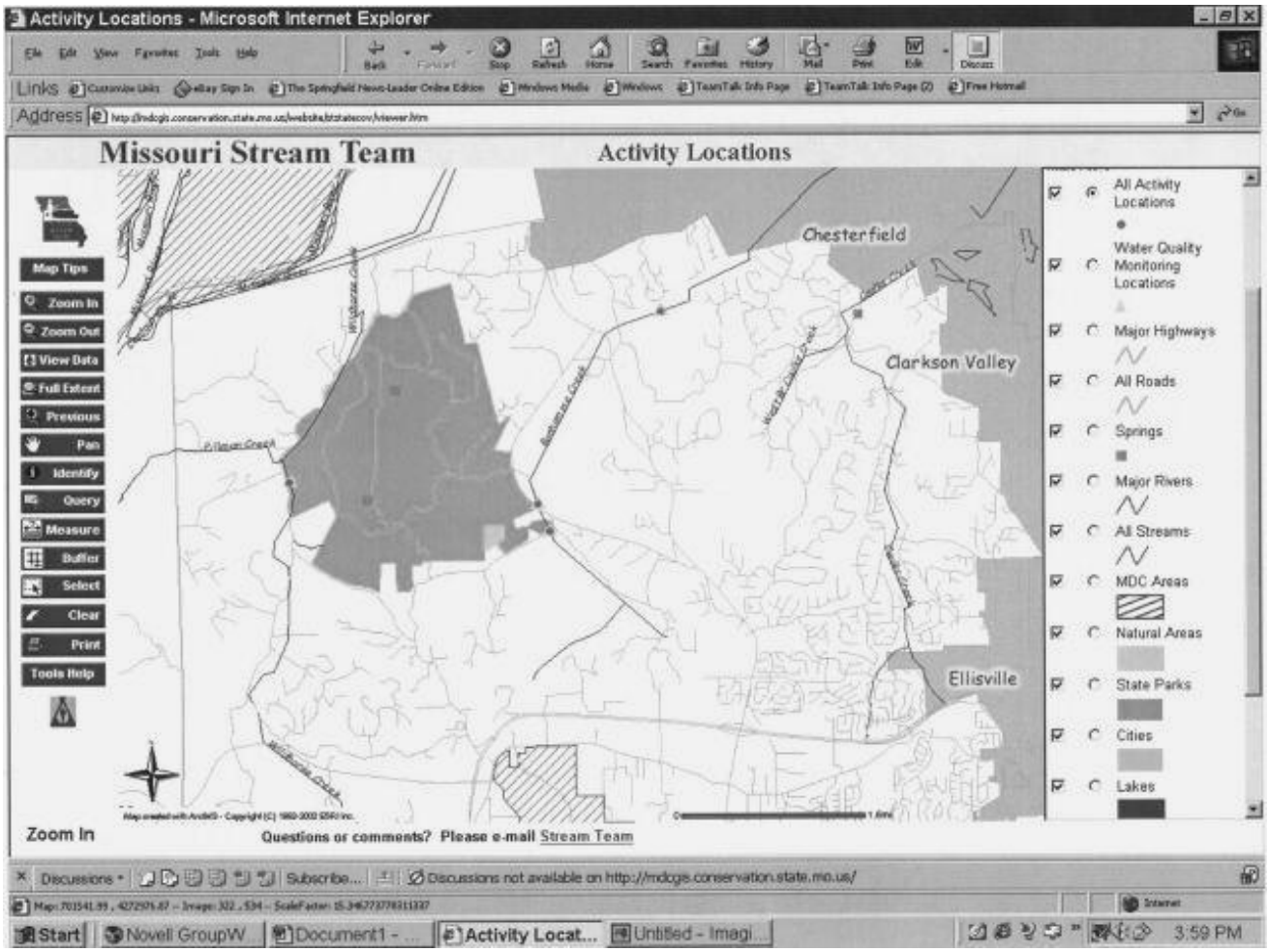
5.) Wanting to fill gaps in monitoring efforts in their area. By researching where state agency staff or other volunteers were already monitoring, they chose a sampling site where baseline data was skimpy or did not exist.

<u>You can determine the extent of volunteer effort in your area in the following ways</u>:

- Talk to other monitors on your Stream Team about where they monitor.
- Contact Stream Team Associations in your area as listed in the *Appendix* of this notebook.
- Contact Stream Team Program staff for assistance.
- Use the Interactive Mapping Site on the Stream Team website: http://www.mostreamteam.org/mapintro.asp.

<u>With the Interactive Map, you can do the following</u>:

- Zoom in to your watershed
- View Stream Team activity and monitoring locations
- Select other features to view such as all roads, public lands, and aerial photos
- Click on monitoring locations to see monitoring dates and data
- Check existing monitoring location(s) for any needed corrections
- Click on a button to email corrections to the proper site administrator



I. CRITERIA TO CONSIDER WHEN CHOOSING A MONITORING SITE

A. HABITAT

In order to perform biological monitoring, select a monitoring site with suitable habitat for macroinvertebrates. If you choose a site that does not contain places for macroinvertebrates to live, you will soon tire of monitoring due to a consistent lack of critters. Finding sites with suitable habitat is sometimes difficult in areas that are highly impacted by human activities. Habitat has been destroyed by stream straightening (channelization) and the forced movement of streams into concrete ditches, which happens in many urban areas.

The best sites contain at least one riffle. These are easy to find in Ozark streams. Ideally, the riffle should be large enough to collect three net sets of macroinvertebrates. The three individual net sets in a riffle should represent "microhabitats" within the riffle. If you cannot find a site within a riffle, you can

sample a mix of alternative habitats including root mats, snags or woody debris, and non-flow areas.

B. OTHER FACTORS

1. Permission to monitor

Always gain permission from the landowner before you monitor. If you have selected a site on public land, like a Conservation Area or State Park, be sure to contact the area manager or Park Superintendent for permission before sampling. This will ensure that you don't interfere with any ongoing studies or projects. Additionally, there may be endangered species concerns of which you are not aware.

Another concern is the amount of monitoring in the area. Many volunteers want to use public land, but if too many people routinely sample at the same location, they can negatively impact the aquatic community through their sampling efforts alone. As a result, area managers need to gauge how much impact area users have on the aquatic resources.

2. What are your monitoring goals?

Your purpose for monitoring will greatly influence your choice of a monitoring site. Decide in advance what you want to learn from the data.

3. Where do tributaries enter the stream?

To determine the overall health of an entire watershed, select a site near the mouth of a particular stream, below all tributaries. To determine the impact of a single tributary, select sites above and below the confluence of the tributary with the main stream.

4. Where are the point and nonpoint sources of pollution located?

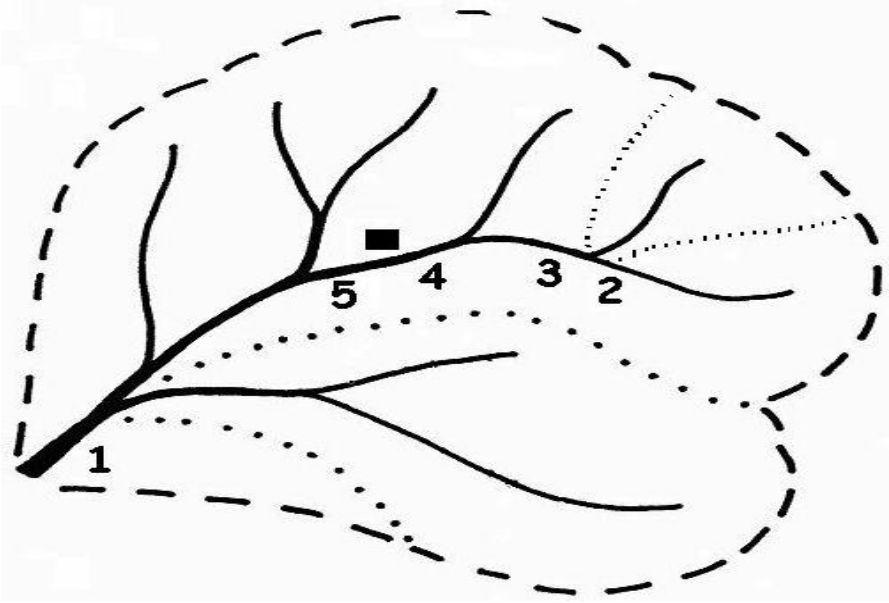
Knowing the sources of possible impacts to your stream will help you interpret the data. If your goal is to determine the impacts of a specific discharge, you need to select two sites, one above and one below any identified discharge. The upstream site can serve as a reference against which to compare downstream data.

Be sure there are no tributaries or other inputs between the discharge site and your downstream sites. Any other source of possible contaminants entering the stream will complicate data interpretation.

5. **Does the site maintain aquatic macroinvertebrates all year?**
   Picking a site that has permanent flow is very important. Our sampling protocol is not designed to assess *intermittent* streams. (An intermittent stream is one that receives groundwater flow only part of the year, and the flow stops when the water table drops below the channel.)

   You should be able to consistently sample three habitats at your site at least twice a year, in the spring and fall. *If part of your site dries up in the driest time of year, as long as at least **some** portion of your 300-foot stretch of stream maintains pools that support aquatic life during the driest times of the year, you may still sample in the spring and fall. This is acceptable. However, if your entire 300-foot site dries up anytime during the year (meaning there aren't even pools of water), you will need to abandon this site and find another one.* Perhaps you can still monitor the same stream, but you will have to move a farther down in the watershed.

In general, one site is often sufficient to determine overall stream health. However, multiple sites are necessary when documenting impacts of a specific pollution source. Below is an example of how a volunteer might choose monitoring sites and assign site numbers to those sites.



SITE 1 Sample at the mouth of a stream to determine the health of the entire watershed.

SITES 2 & 3 Sample above and below the confluence of a tributary to determine the impacts that activities in the tributary's watershed have on water quality.

SITES 4 & 5 Sample above and below point or nonpoint source discharges to determine their specific impacts on water quality.

Remember that each one of your sites is a 300-foot stream segment, and individual sites should not overlap.

II. SITE NUMBERS

Site numbers must be in consecutive and **chronological** order. Label each site you monitor with a number, **beginning with #1**. **Continue to use that number for that site each time you submit data from that site**. If you abandon a monitoring site, **do not** assign that number to a future monitoring site (i.e., **do not** reuse site numbers). Your second site should be given a number that is specific to that place (i.e., Site #2). **If you routinely monitor only two sites, even if they are on different streams, one site should be labeled Site #1 and the other should be labeled Site #2.**

An Example of Site Numbering:

Your site number will be tied to your Stream Team number and your name. If you have questions about the site number, write it on your data sheet and/or contact us by phone or email at the numbers/addresses provided in the *Appendix* (orange page) of this notebook.

Example 1.) Bea A. Volunteer, after attending the Introductory workshop, joins Stream Team No. 68. Bea wants to monitor a site that Mac and Ron Vertebrate previously monitored for Stream Team No. 68. Mac and Ron are moving to Tasmania and can no longer monitor this site (it's too far to commute). Although Bea's site was originally adopted by Mac and Ron's Stream Team (No. 68) and was Site #3, it will now be labeled as Bea's Site #1 because it is her first site. The only way it would remain Site #3 for Bea is if she had already adopted two other sites previously.

Example 2.) Dewey Lovewater's Stream Team used the following verbal description for their Site #1 for six consecutive data submissions. His description was "50 yds. upstream from Greene County Farm Road 195." The following year he submits data with a verbal description "200 yards upstream from Green County Farm Road 195." Since a site is defined as 300 feet (100 yards) in length, his new verbal description insinuates that he has moved to a new site. In actuality, he simply forgot to use the same verbal description and made up a new one. Unfortunately, the discrepancy held up his data from being entered in the Stream Team databases until program staff could contact him and determine whether it was really a new site or just the wrong description for his Site #1.

III. SITE DESCRIPTION

A. How to describe your site

Please verbally describe on every data sheet where your site is on a stream. Use a brief site description that will enable program staff to locate your site on a map, or drive directly to the site. Often you can use these descriptions:

1. Street or highway names
2. Upstream or downstream from bridges
3. Major intersections

4. The approximate distances from those landmarks (e.g., 100 feet upstream from Hwy P Bridge).

For a particular site, always use the same verbal description on the data sheet. Changing verbal descriptions can be confusing to program staff when reviewing your data, so please be consistent. Changing the verbal description of your site may put your data on hold until staff can determine whether it is the same site or a new site.

To help you remember a particular site number and description, consider filling out just these items listed at the top of your data sheets, including Stream Name, County, Site #, Site Description, and Stream Team Number, and then making copies of the data sheet to use when sampling that particular site in the future. That way you don't have to remember what site number and description you used last time!

Why is there so much attention on site location/description? If you think about it, if we don't know where your site is located, your data will not be useful to the program and others.

B. Site Selection Data Sheet

The site Selection Data Sheet was designed to help familiarize you with the features of your site and to guide you through the process of determining what kind of habitat exists there. As explained in the previous section, it is important to fill out the required information as completely as possible.

SITE NUMBER. This is the site number you designate. It becomes very important if you choose to monitor more than one site. ***Number sites in the chronological order in which you adopt them, and ALWAYS use the same site number for a particular monitoring location.***

<u>The first time you send in data on a site</u>, BE SURE to check the box on the data sheet next to "Site #," and send in a map illustrating the location of the site along with your data sheet.

STREAM and **COUNTY.** List the name of the stream as it appears on your map and the county in which the monitoring site is located (not the county in which you live unless they happen to be the same). If your stream is not named on a map you may call it "Unnamed Tributary to…" and list the next named stream into which your stream flows.

SITE DESCRIPTION. This refers to a verbal description of the location. Consider it to be driving directions. Please use a brief description that is both easy for you to remember *and* easy for program staff to fit in our databases. Examples of descriptions would be "Tucker's Ford at the intersection of Highway 183," or "100 feet upstream of the Highway P bridge." ***Always use the same verbal description each time you monitor the site.*** Although some people like to include GPS data as part of the site description, it is not a substitute for the verbal description. We use the keywords in your verbal description to match to your site in the database, so we **must** have a verbal description.

DATE. Use the date the information on the data sheet is collected in the month/day/year format.

TRAINED DATA SUBMITTER. This is the name of the person who attended the Introductory Level Volunteer Water Quality Monitoring workshop or higher level (i.e., Level 1, 2, or 3) course <u>and to whom the data will be assigned</u>. Data is assigned the Quality Assurance/Quality Control (QA/QC) level of the Trained Data Submitter, and, as detailed in Chapter 1, the QA/QC level of the data determines how it can be used by agencies. **If you have attended the Introductory workshop, you may only "submit" data (that is, be listed as the "Trained Data Submitter") for Site Selection, Stream Discharge and Biological Monitoring. Due to QA/QC, the**

program can accept submitted Visual Survey and/or Water Chemistry data from a volunteer <u>only</u> after Level 1 training has been completed.

TRAINED DATA SUBMITTER'S STREAM TEAM NUMBER. Please enter the number of the Stream Team under which this data is submitted. Reference definition of "Trained Data Submitter" above.

TRAINED PARTICIPANTS. List names of others on your Team **who have also attended at least an Introductory Level workshop** who are assisting the Trained Data Submitter on that day of data collection. You may also include names of individuals who assisted in the monitoring but have not yet attended any workshops. In addition, be sure to mention on your *Missouri STREAM TEAM Activity Report* the names of *everyone* on your Team (trained or otherwise) who helped with the monitoring so that they all get credit for the activity! You may need to attach a list of names to the Activity Report to ensure all get credit.

<u>NOTE:</u> *The following observations are highly subjective. It is very important that you take your time and be as accurate as possible in describing the conditions at your stream site.*

WEATHER CONDITIONS. Is the weather clear, cloudy, partly cloudy, or is it raining? Check the box that most accurately describes the weather on the day you are collecting data. If none of these choices fit, please describe for us in the section marked "Other."

TEMPERATURE. Using the thermometer provided in class, record the air temperature and the temperature of the water. Temperature should be recorded in an area that is not exposed to direct sunlight. Please allow plenty of time for the thermometer to acclimate to the ambient temperature.

WATER APPEARANCE. Use a clear plastic container to scoop up a small amount of water from the stream. Is the water clear, brown, milky, or oily? Check the box

that most accurately describes the color of the water. If none of these choices fit, please describe in the section marked "Other."

WATER ODOR. Using the same container of water, raise it to your nose and smell it. Is there an odor? Does it smell rotten, musty, fishy, or is there a chlorine odor? Check the box that most accurately describes the odor of the water. As always, if you smell something different please describe in "Other."

HABITAT. Check all the choices that apply. Your 300 ft. site may contain a high percentage of these habitat choices. Most sites should contain at least one riffle, but you may also have pools, root wads, logs, and runs. If you have other habitat features not listed on the data sheet, feel free to list them under "Other."

RIPARIAN COVER. We would like to know how much riparian cover is available at your site. Is the area fully shaded, fully exposed, or somewhere in between? Check the box that most accurately describes the riparian conditions at your site.

VEGETATION. Describe the type of vegetation present (or lack thereof) by checking the appropriate boxes. Check all that apply. If you have other vegetative features not listed on the data sheet, feel free to list them under "Other."

ALGAE. Is there algae in your stream? Is it everywhere, or only in spots? If algae are present, is it close growing or filamentous (strands over 2 inches long)? Check all that apply. If none of the choices describes the algal conditions at your site, feel free to elaborate under "Other."

STREAM BED. Take a close look at the stream bed at your site. What type of substrate do you see? We have listed the most common types of substrate and would like you to rank them from 0 -5 with 5 being the most prevalent substrate type. The 0 may be used more than once if some of these types of substrate do not exist at your site. It is quite possible, though that you may have all five types present in varying a

mounts within your site. Try to rank them from the most prevalent down to the least prevalent.

AQUATIC ORGANISMS. Since you have not received your biological monitoring equipment yet, you cannot do an extensive survey of the organisms present. However, please mark the sheet if you happen to see fish at your site. If you choose to turn over a few rocks and find invertebrates, check that option, too. You do not need to identify them, but if you would like to do so enter that information in the area reserved for "Other."

LAND USE IN THE WATERSHED. Take a look around your stream site. How is the land within the watershed being put to use? Are there homes and factories? Are there woods and pastures? Check all the choices that apply to your site and if you have other land uses to list, do so in the section marked "Other."

C. Things to remember on all data sheets

In order to track your data, it is extremely important to list the following information on all data sheets. **If any of these six pieces of information are missing from your data sheet, processing of your data will be delayed.**

A fully completed sheet ensures faster processing of your data.

1. **Stream Name**
2. **Site Number:** It is critical that site numbers are not duplicated to prevent program staff from assigning data to the wrong place on the stream or even to the wrong stream.
3. **Site Description:** Describe the site with a brief, yet thorough, verbal description. This description should equate to driving directions and should **not** be something like, "This is a well-wooded site just left of the fallen tree on private property" but rather, "Upstream of the Edgewood Dr. crossing, ¼ mile west of Highway 179."
4. **Date:** Some data results naturally vary with the seasons, so this is critical. Please be sure to use the year in your date. We will accept data from any year, but we do need to know what year it was collected.

5. **Stream Team Number:** Use the number of the Stream Team you are representing when collecting the data.
6. **Trained Data Submitter:** This is the person responsible for the data. This information helps program staff to know what level of Quality Assurance/Quality Control to assign to the data since data of different levels can be used for different purposes.

IV. SITE MAP

When submitting data from a new site, please include a copy of a map on which you have clearly marked your monitoring site. This is only necessary the first time you send in data for a new site. After that, your map and location are on file and you can send in your data sheets without an accompanying map.

Before you collect data at a new site, it is helpful to locate the site on the map you intend to send in with your data. Ideally you would photocopy a portion of an appropriate map (e.g., topo or county map). You do not need to send an entire USGS topographic map. An 8 ½" x 11" photocopy is *fine as long as you include the following information on the map itself*. This information is extremely helpful, especially since it's possible for the map to become separated from the data sheets, so each needs to be identified on its own.

1. ***Stream Team Number*** **(e.g., Stream Team No. 1221)**
2. ***Trained Data Submitter's name***
3. ***Topo quadrangle map name*** **(if using a topo – e.g., Marble Hill)**
4. ***County***
5. ***Stream name***
6. ***Site number***
7. ***Site description***
8. ***An "X" marking the sampling site***

You can write this information on the front or back of the map, but please do attach the map to your data and make sure it is identified with your name. We sometimes receive maps that are not labeled and then if they become detached from the data they were

sent with, we do not know how to match the map with the data collector. A small square of white paper with all the information printed on it works well as a label when taped to the front of the map. Topographic and county maps work best for helping program staff accurately locate your site. **Reference the *Appendix* for information on how to get copies of different types of maps, including locating them on the Internet (e.g., http://geology.com/topo-maps/ OR http://www.cares.missouri.edu/).** If you decide to order a topo map, your instructor has an *Index Map for Topographic Sheets* to help you determine which quadrangle map(s) you will need to order.

Please reference examples of helpful maps at the end of this chapter.

If you are not able to provide us with all the information listed above, please don't let that keep you from sending a map in with your data! Simply mail in a map with your name on it and draw an "X" to mark your site. If needed, we will work with you to help us identify your site's location. We appreciate your time and assistance.

We recommend making photocopies of your site map for your future use **before** you send a copy in with your first set of data from the site.

When a map is submitted with the data sheets, the data processing is not delayed. **Be aware that we cannot put your data into the Stream Team databases until we have the location of your sampling site accurately identified**.

Program staff needs this information to determine the GIS coordinates for your site(s) before they can enter the data into the program databases. Even if you report the necessary geographic information, please send the map too.

V. Global Positioning System (GPS) Information

Do you have a GPS unit and are anxious to use it to report site location information? Due to a variety of GPS formats and map data, if you wish to report map-related data in GPS format, **please complete one of our *GPS Site Location Data Sheets* and send it in with your data**. We've provided a blank data sheet at back of this chapter from which you

can make copies. If you need additional copies, they can be downloaded and printed on the Stream Team website:

http://www.mostreamteam.org/Documents/VWQM/GPSDataSheet.pdf

There are several things you can do in order to allow a GPS unit to provide you information that is as accurate as possible. One of the most important things you can do is allow the unit to stabilize. The longer the unit searches for satellites the greater its accuracy. It takes multiple readings from available satellites to obtain more measurements. The GPS unit will give you a position with an associated position error. Wait until your position error is no more than ± 20 ft. Depending on your GPS unit, this may take several minutes.

Is your GPS unit equipped with Wide Angle Augmentation System (WAAS)? WAAS uses signals from base stations (on the ground) to refine the calculations used to improve accuracy. If your GPS unit has this feature, you may need to go into your settings and turn it on.

You should also take your reading from a location which has the best exposure the sky. Taking readings where signals bounce from reflective surfaces may add false distances and can decrease the accuracy of the reading.

It is important to know which set of data your unit is using to plot your position. Setting your GPS Unit to use NAD83 datum will provide you with the most accurate information.

There are also two coordinates types commonly used, Latitude/Longitude and Universal Transverse Mercator (UTM). These are the "grids" on which your position is displayed. The UTM coordinate system was developed by the United States Army Corps of Engineers in the 1940s and was based on an ellipsoidal model of the Earth. There are ten "zones" for the United States. Most of Missouri is in zone 15, though sections of the southeast part of the state are in zone 16.

Decimal degrees, degrees/minutes/seconds, and decimal minutes are all forms of latitude and longitude. Many of you may be familiar with degrees/minutes/seconds. Decimal degrees are the Metric equivalent, and allow for greater accuracy, so this is the preferred coordinate format. Please send us your information in decimal degrees.

This will be a great **addition** to the map you send in with any new site. Please feel free to send one in on any of your old sites, too. However, GPS data does not negate the need to send a map and include a verbal description.

VI. ENDANGERED SPECIES

Note that regardless of where you sample, you need to carry your Stream Team Identification card in order to sample macroinvertebrates. By carrying this card, you are exempted from having to obtain a Wildlife Collector's Permit from the Missouri Department of Conservation. This is especially important when sampling within the home range of endangered species.

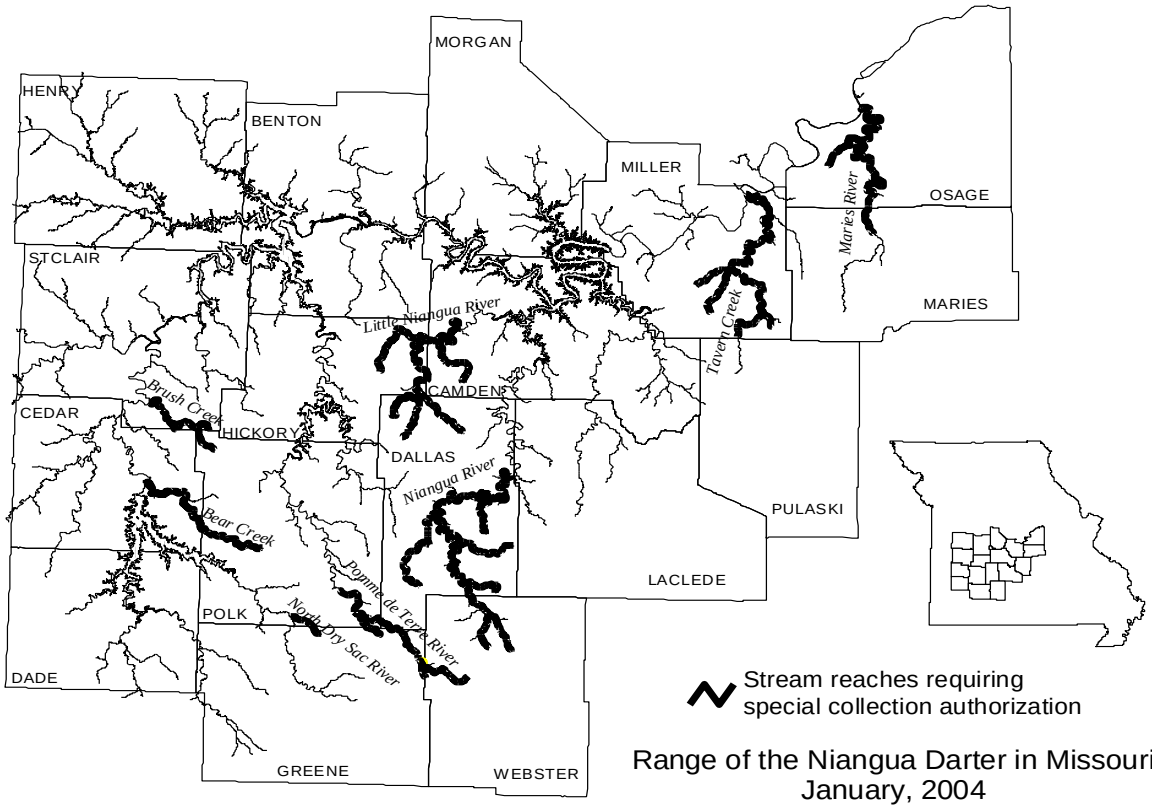
Niangua darters and Topeka shiners are listed as endangered by the U.S. Fish and Wildlife Service and the Missouri Department of Conservation. Topeka shiners spawn in runs and pools over the nests of sunfish, so they should not be affected by volunteers' monitoring efforts to collect macroinvertebrates. However, because the Niangua darter spawns in riffles, kicking up macroinvertebrate samples in riffles <u>can</u> be detrimental to spawning.

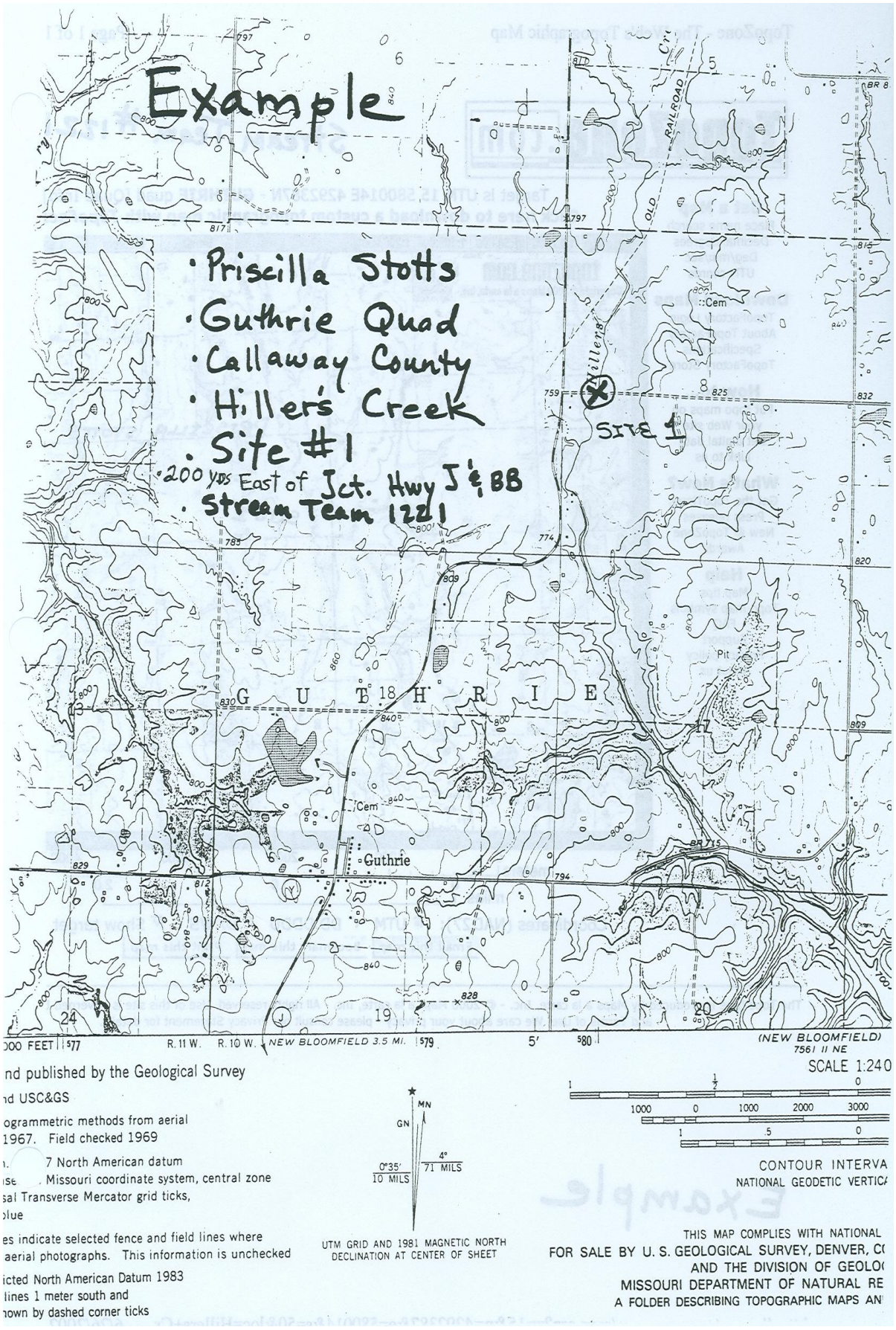
In order to avoid disturbing Niangua darter habitat during spawning season, **do not monitor macroinvertebrates between March 15 and June 15 in the following Ozark streams. These are within the known range of the Niangua darter:**

- **Niangua River watershed:** Niangua River and Greasy Creek
- **Little Niangua River watershed:** Little Niangua River, Mack's Creek, Starks Creek, Thomas Creek and Cahoochie Creek
- **Sac River watershed:** Sac River, Bear Creek, Brush and Panther Creek

- **Tavern Creek watershed:** Tavern Creek, Barren Fork, Brushy Fork, Kenser Creek and Little Tavern Creek
- **Other waterways:**
  - Maries River
  - Little Maries Creek
  - North Dry Sac River
  - Pomme de Terre River
  - South Fork of the Pomme de Terre River
  - Little Pomme de Terre River

Please continue to conduct visual survey, water chemistry and stream discharge monitoring in this time period (March 15 - June 15).




Example
• Priscilla Stotts
• Guthrie Quad
• Callaway County
• Hiller's Creek
• Site #1
• 200 yds East of Jct. Hwy J & BB
• Stream Team 1221
SITE 1
Hiller's
OLD RAILROAD
Cem
Pit
Guthrie
G U T H R I E
R. 11 W.
R. 10 W.
NEW BLOOMFIELD 3.5 MI.
(NEW BLOOMFIELD)
7561 II NE
SCALE 1:240
CONTOUR INTERVA
NATIONAL GEODETIC VERTICA
MN
GN
0°35'
10 MILS
4°
71 MILS
UTM GRID AND 1981 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET
nd published by the Geological Survey
ogrammetric methods from aerial
1967. Field checked 1969
7 North American datum
Missouri coordinate system, central zone
sal Transverse Mercator grid ticks,
es indicate selected fence and field lines where
aerial photographs. This information is unchecked
THIS MAP COMPLIES WITH NATIONAL
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, C
AND THE DIVISION OF GEOLO
MISSOURI DEPARTMENT OF NATURAL RE
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AN

Netscape Present

Home | Help

MAPQUEST.

MAPS | DRIVING DIRECTIONS | ROAD TRIP PLANNER | YELLOW PAG

maps

- **Address**
- **Airport**
- **ZIP Code**
- **City**
- **Area Code**
- **Lat / Long**
- **Road Atlas Key**
- **Saved Maps**

What's Nearby

Search for the nearest:

Search

Orbitz Travel Deals

- **Flights:** Find the lowest fares to your destination!
- **Rental Cars:** Find special offers on rental prices now!
- **Lodging:** Find discounted rates on premier hotels in your destination city!

ORBITZ

Yellow Pages

Search **New Bloomfield** for:

Auto repair

Search

Location:

New Bloomfield, MO
US

Stream Team #1221

Map a New Location | Get Directions To This Location

PRINT MAP | SAVE MAP | DOWNLOAD MAP TO PDA | E-MAIL MAP

CLICKING ON MAP WILL: Zoom In | Re-center | Move Location

ADDITIONAL MAP FEATURES: Customize Map | Add A Location

Map Legend NAVTECH ON BOARD

Example

SITE SELECTION DATA SHEET

If this is a new site, please check the box next to "Site #" and be sure to attach a map.

☐ Site # _____ Stream _____ County _____

Site Description _____

Date _____ Trained Data Submitter (person assuming responsibility for this data) _____

Trained Data Submitter's Stream Team Number _____ Rainfall (inches in last 7 days) _____

Trained Participants _____

Weather Conditions: ❑ Clear ❑ Cloudy ❑ Partly Cloudy ❑ Rain

Other: _____

Temperature:

Air Temperature (°C) _____ Water Temperature (°C) _____

Water Appearance: ❑ Clear ❑ Brown ❑ Milky ❑ Oily

Other: _____

Water Odor: ❑ Rotten ❑ Musty ❑ Fishy ❑ Chlorine ❑ None

Other: _____

Habitat: (Check all that apply)

❑ Pool	❑ Root Wads	❑ Undercut Banks
❑ Riffle	❑ Logs or Stumps	❑ Rock Ledges
❑ Run	❑ Aquatic Vegetation	❑ Log Piles
❑ Backwater	❑ Large Boulders	❑ Artificial Objects

Other: _____

Riparian Cover: Stream is ...

❑ Fully exposed (0-25% of stream is shaded from the sun)
❑ Partially Exposed (25-50%)
❑ Partially Shaded (50-75%)
❑ Fully Shaded (75-100%)

Vegetation: (Check all that apply) ❑ Trees ❑ Shrubs ❑ Grasses/Weeds ❑ Root Mats ❑ Bare Ground Other: _____

Algae:

Is the algae located: ❑ In Spots ❑ Everywhere ❑ Absent

Is the algae: ❑ Close-Growing (< 2") ❑ Filamentous (> 2")

Other: _____

Stream Bed: (Rank each substrate 0-5 with 5 being most prevalent.)

Silt/Mud	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	❑ 5
Sand	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	❑ 5
Gravel	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	❑ 5
Cobble	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	❑ 5
Bedrock	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	❑ 5

Aquatic Organisms: ❑ Fish ❑ Invertebrates

Other: _____

Land Use in the Watershed: (Check all that apply)

❑ Pasture/Grazing Land	❑ Cropland	❑ Woods	❑ Park
❑ Homes	❑ Factories	❑ Stores	❑ Confined Animal Feeding Operation (CAFO)

Other: _____

Volunteer Monitoring - 11/08

SITE SELECTION DATA SHEET INSTRUCTIONS

This data sheet has been developed to help you to become familiar with your 300-foot monitoring site and to identify it to program staff. Fill out all of the data sheet items and any additional notes you feel help describe the stream and riparian corridor. Return this data sheet, a map with your site clearly marked, as well as the Stream Discharge data sheet to the address below to receive your biological monitoring equipment.

Data Sheet Items

Site Number. You must designate this number. It becomes very important if you choose to monitor more than one site. Number your sites as you chronologically choose them.

Stream and County. List the name of the stream as it appears on your map (e.g., a USGS topographic map). Locating your site on a map also ensures you record the appropriate county.

Site Description. This refers to a verbal description. Verbally describe where you are on the stream using street or highway names, bridges, approximate distances from landmarks, etc. Please be consistent and use the same verbal description for the same site (e.g., 100 feet upstream of Hwy. P bridge).

Date and **Time.** Please use military time (e.g., 2:00 p.m. is 1400, or 2:45 p.m. is 1445).

Trained Data Submitter. List the name of the person assuming responsibility for these data.

Rainfall (inches in last 7 days). Record the amount of rain that fell with in the watershed in the past week.

Trained Data Submitter's Stream Team Number. Enter your Stream Team number.

Weather Conditions. Please describe the cloud cover (e.g., sunny, partly cloudy, etc...).

Temperature. Measure the air temperature before measuring the water temperature. Read the water temperature while the thermometer is in the water to guarantee an exact reading.

Water Appearance. Collect a sample of water using a clear plastic container and describe the water's color (e.g., clear, brown, green, milky, oily sheen, etc...).

Water Odor. Take a whiff from your plastic container. If any odor is present, please describe (e.g., sewage odor, chemical odor, petroleum odor, rotten egg odor, musty odor, organic odor, no perceptible odor, etc...).

Habitat. Indicate what habitat types are present for aquatic life within your monitoring site.

Riparian Cover. For the purpose of this data sheet the riparian one is the area extending back from the top of each stream bank for a distance of 100 feet. Estimate the percentage of this area that is covered by vegetation.

Vegetation. Indicate what types of vegetation are present along the banks and in the riparian area at your monitoring site.

Algae. Indicate where on the stream bottom algae is located and if it is filamentous or close-growing.

Stream Bed. Rank the various sized sediments listed 0-5 with 5 being the substrate that is most prevalent and covers the most of the stream bed, rank a substrate 0 if it appears to be not present.

Aquatic Organisms. Check the box if there are fish or aquatic invertebrates present. You may also note any other aquatic vertebrates you see.

Land Use in the Watershed. Indicate the dominant land uses within your stream's watershed.

PLEASE KEEP A COPY AND SEND ORIGINAL DATA TO:

Priscilla Stotts
Water Protection Program
Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176

Water Quality Volunteer

Volunteer Monitoring - 11/08

GPS DATA SHEET

Fields with an asterisk (*) are required fields. Please provide Coordinates in either Latitude/Longitude or UTMs.

***1. Stream Name:** _____ **County:** _____

***2. Site Description:** _____

***3. Team Number:** _____ ***4. GPS Data Submitter:** _____

***5. Site Number:** _____ ***6. Date:** _____/_____/_____ ***Time (24hr):** _____

GPS RECEIVER INFORMATION

***7. GPS Make and Model:** _____

8. Wide Angle Augmentation System (WAAS) Enabled: ☐ Yes ☐ No ☐ Don't Know

DATUM

***9. Horizontal Datum:** ☐ North American Datum (NAD) 1927 ☐ World Geodetic Survey (WGS) 1984

☐ North American Datum (NAD) 1983 ☐ Other: _____

POSITION ERROR INFORMATION

10. Stabilizing Time (in seconds): _____ ☐ WAAS Averaging

11. Estimated Position Error (EPE): _____ ☐ Feet ☐ Meters ☐ Not Available

COORDINATES - LATITUDE AND LONGITUDE OPTION (preferred option)

12. Latitude: _____ **N**

13. Longitude: _____ **W**

14. Format: ☐ Degrees Minutes Seconds (ddd° mm' ss.s") ☐ Decimal Minutes (ddd° mm.mmm')

☐ Decimal Degrees (ddd.ddddd°) (preferred format) ☐ Other: _____

COORDINATES - UNIVERSAL TRANSVERSE MERCATOR (UTM) OPTION

15. Easting: _____

16. Northing: _____

17. UTM Zone: ☐ Zone 15 ☐ Zone 16

COMMENTS: _____

_____

PLEASE KEEP A COPY AND SEND ORIGINAL TO:

Water Protection Program
Department of Natural Resources
P. O. Box 176
Jefferson City, MO 65102-0176

Water Quality Volunteer

Volunteer Monitoring – **05/08**

GPS DATA SHEET INSTRUCTIONS

Please read the following descriptions before filling out this sheet. All fields with an asterisk (*) are **required fields**. Please note that Latitude/Longitude in Decimal Degrees (ddd.ddddd°) are the preferred coordinates, but Universal Transverse Mercator (UTM) coordinate systems may also be used. Due to the technical complexity of Global Positioning Systems and Geographic Information Systems, proper completion of these fields is necessary to establish an exact location. If these fields are not completed, the program cannot use your GPS data.
This sheet does not replace the map of your site. If you have not already done so, you will still need to send a map.

The Data Sheet Items

1. **Stream Name** and **County**. List the name of the stream as it appears on your map. Locating your site on a map also ensures you record the appropriate county.
2. **Description**. This refers to a verbal description of the site. Verbally describe where you are on a stream using street or highway names, bridges, approximate distances from landmarks, etc.
3. **Team Number**. This is the Stream Team number this data will be submitted under.
4. **GPS Data Submitter**. The person actually using the GPS receiver and recording the data.
5. **Site Number**. You and your team must designate this number. It becomes very important if you decide to monitor more than one site.
6. **Date** and **Time**. Please use military time (e.g. 2:00 p.m. is 1400 or 2:45 p.m. is 1445).
7. **GPS Make and Model**. Please provide the brand name of your GPS receiver (e.g., Garmin, Lowrance, Magellan, etc.) and the model if known (e.g., eTrex Vista, GlobalMap100, Meridian Platinum, etc.)
8. **Wide Angle Augmentation System (WAAS) Enabled**. WAAS is an additional set of satellites, only one of which is "visible" from most areas in Missouri. If your GPS receiver is WAAS capable and this function is being used, check yes. If this is not available or not in use, check no. There is a checkbox available if you do not know.
9. **Horizontal Datum**. Next to the coordinates themselves, this is the most **important** piece of information to collect. Your GPS receiver displays where you are based on this reference. Without the horizontal datum, it is impossible to accurately place the coordinates on a map. This information can usually be found quite easily in the menu system of your GPS receiver. You may need to consult the user manual that came with your GPS receiver.
10. **Stabilizing Time**. The GPS receiver should be allowed to stabilize for at least two minutes. Enter the number of seconds the receiver was allowed to stabilize before the coordinates were recorded. Many receivers automatically do this and refer to it as the "averaging" time. Some receivers will include the averaging time of WAAS satellites. If WAAS averaging is obtained, check the box. To find these functions, you may need to consult the user manual that came with your GPS receiver. If this function is not available, record this using a wristwatch or stopwatch.
11. **Estimated Position Error**. Most consumer GPS receivers display a range of error known as Estimated Position Error. If this is available on your receiver, please record it and check the appropriate distance measurement. You may need to consult the user manual that came with your GPS receiver.

NOTE: You have the **OPTION** of using two coordinate systems, Latitude/Longitude **OR** Universal Transverse Mercator.

If using the latitude/longitude option

12 & 13. Latitude and Longitude. Enter coordinates in these fields **only** if using Latitude/Longitude option. While at your monitoring site, enter the latitude and longitude coordinates displayed on your GPS receiver, copying the exact coordinates in the displayed format (see Item 14 below).

14. Format. Check the box that represents the Latitude/Longitude coordinate format you are using. If the GPS user does not know the coordinate format, this information can usually be found quite easily in the menu system of your GPS receiver. You may need to consult the user manual that came with your GPS receiver.

If using the Universal Transverse Mercator (UTM) option

15 & 16. Easting and Northing. Enter coordinates in these fields **only** if using UTM option. While at your monitoring site, enter the UTM coordinates exactly as they are displayed on your GPS receiver.

17. UTM Zone. Check the box for the UTM Zone number that is displayed on your GPS receiver.

Comments. Please include any conditions that may hinder the ability of your GPS receiver to receive data (e.g., dense clouds, heavy tree coverage, structures, etc.). If there is additional information from your GPS receiver that may be helpful to us, such as different stabilizing time or position error measurements, please include them in this field. Please include any other information that we may find helpful.